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| 09/692,957 | 10/20/2000 | John Edward Archibald JR. | SJO9-2000-0056US1 | 6420 |

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EXAMINER

THAI, TUAN V

ART UNIT PAPER NUMBER

2186

DATE MAILED: 11/16/2004

15

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/692,957

Applicant(s)

ARCHIBALD ET AL.

Examiner

Tuan V. Thai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 20-22 is/are rejected.
- 7) ☒ Claim(s) 16-19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

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Part III DETAILED ACTION

Specification

1. This office action is in response to Applicant's communication filed July 15, 2004. This amendment has been entered and carefully considered. Claims 1-22 remain pending in the application.

2. Applicant's arguments with respect to claims 1-38 have been considered but are deemed to be moot in view of the new grounds of rejection. The finality of the previous office action is hereby withdrawn. Any inconvenience is *SINCERELY* regretted.

3. Applicant is reminded of the duty to fully disclose information under 37 CFR 1.56.

Claim Rejections - 35 USC § 112

4. Claims 20-22 are rejected under 35 U.S.C § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claim 20, the recitation of ``the system drive'' (line 7) lacks proper antecedent basis.

Claims 21 and 22 are rejected because they are dependent on the rejected base claims.

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Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-15 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Menon et al. (6,397,229); hereinafter Menon in view of Tuma et al. (USPN: 5,070,474); hereinafter Tuma.

As per 1, Menon in his teaching of storage-controller-managed outboard incremental backup/restore of data, discloses the invention as claimed including data recording media having plurality of sectors wherein each sectors comprises multiple fields as being equivalent to data storage device 108 comprises a DASD such as a magnetic or optical disk drive (e.g. see figure 1, column 2, lines 51-53), Menon further discloses that the data storage device 108 comprises plurality of sectors wherein it's further known in the memory storage art that each memory sector of magnetic disk drive 108 **must** at least comprise multiple fields including data field for storing user data, and address field for storing address relating to the user data field (e.g. see column 4, lines 61-63). Noting that Menon clearly disclose the status

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bit map 118 stored in the memory 114 of storage controller 104 wherein each bit in the bit map 118 is assigned to each sector of the storage 108 for indicating the backup status for each sector (e.g. see column 4, lines 40-52). Menon disclose the bit map 118 is stored separately in the memory 114 of the storage controller 104 and not being created as part of the sector format of data storage 108 in order to arrive at the extended format sector of the Applicant's current invention. Tuma, however, in his teaching of the disk-extended sector format, discloses a data recording media (hard disk 101, e.g. see figure 2) comprising a plurality of extended format sectors 10 (e.g. see column 3, lines 14 et seq.). Tuma discloses each of the extended format sector 10 comprising several fields, in addition to a user data sector field 17, for storing user data (e.g. see column 3, lines 16-17; figure 1a) and a status indicator field (flag-status-and-logical-unit field 13b) for indicating the status of the user address data field (e.g. see figure 1b, column 3, line 31). Accordingly, it would have been obvious to one have ordinary skill in the art at the time the current invention was made to combine the teaching of both invention, for the subject matters detailed above, to arrive at the Applicant's current invention. By utilizing the extending format sectors as taught by Tuma and to including the backup-status-data field integral within each sector (instead of separately implemented on different memory),

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(a) it would allow for direct access of backup-status information from the sector level, therefore increasing the overall system throughput, and (b) preferable memory-area saving property can be greatly achieved by reducing unnecessary replication of access support circuits associated with each of the sector, thereby to improve the overall system performance, and broadening one's potential market and saving investment capital.

As per claim 2, Menon discloses the incremental backup indicator (bit map bit 118) indicates whether the user data in the user data sector field has been written to backup storage subsequent to a previous backup operation (e.g. see column 2, lines 4-7; and column 4, lines 49 et seq.);

As per claim 3, Menon discloses the incremental backup indicator bit of bit map 118 comprises a single bit (e.g. see column 4, lines 49 et seq.);

As per claim 4, Menon discloses the incremental backup indicator comprises an indicator of whether the user data in the user data sector field has been written to backup storage subsequent to a previous backup operation (e.g. see column 2, lines 4-7; and column 4, lines 49 et seq.); in addition, the data indicating the age of the user data sector field, for example, Menon discloses when the backup operation is completed, information about the backed up data (including identification of the source of the data, including an identification of the

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data storage device 108 and an identification of a sector's location on the data storage device 108, and the date and time that the backup operation was performed) is also recorded (e.g. see column 5, lines 32-39);

As per claim 5, the further limitation of the backup indicator indicates whether the user data sector field has been written to is equivalently taught as "at initial installation, before data is stored on the data storage device 108, the bit map 118 is created, the association between bits and sectors is established, and the bits are cleared. Thereafter, once a sector is changed on the data storage device 108, *but before completing a backup operation for the sector to the tape drive 110*, an indication of the modification is saved by setting the bit associated with the sector in the bit map 118 stored in the memory 114 of the storage controller 104" (e.g. see column 4, lines 61 et seq.);

As per claim 6, Menon in his teaching of storage-controller-managed outboard incremental backup/restore of data, discloses the invention as claimed including data storage system comprises magnetic storage medium having servo information recorded on servo tracks interspersed between a plurality of sectors is taught as data storage device 108 comprises a DASD such as a magnetic or optical disk drive which are known to structurally comprise data tracks interspersed amongst multiple sectors (e.g.

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see figure 1, column 2, lines 51-53); in addition, it should be noted that a motor and head assembly for reading and writing data on the sectors are known to be embedded in any DASD device that is taught by Menon to the extent that it is being claimed and being detailed above. Menon further discloses that the data storage device 108 comprises a plurality of sectors wherein it is further known in the memory storage art that each memory sector of magnetic disk drive 108 **must** at least comprise multiple fields including a data field for storing user data, and an address field for storing an address relating to the user data field (e.g. see column 4, lines 61-63). Noting that Menon clearly discloses the status bit map 118 stored in the memory 114 of storage controller 104 wherein each bit in the bit map 118 is assigned to each sector of the storage 108 for indicating the backup status for each sector (e.g. see column 4, lines 40-52). Menon discloses the bit map 118 is stored separately in the memory 114 of the storage controller 104 and not being created as part of the sector format of data storage 108 in order to arrive at the extended format sector of the Applicant's current invention. Tuma, however, in his teaching of the disk-extended sector format, discloses a data recording media (hard disk 101, e.g. see figure 2) comprising a plurality of extended format sectors 10 (e.g. see column 3, lines 14 et seq.). Tuma discloses each of the extended format sectors 10 comprising several fields, in addition to a user data sector

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field 17, for storing user data (e.g. see column 3, lines 16-17; figure 1a) and a status indicator field (flag-status-and-logical-unit field 13b) for indicating the status of the user address data field (e.g. see figure 1b, column 3, line 31). Accordingly, it would have been obvious to one having ordinary skill in the art at the time the current invention was made to combine the teaching of both invention, for the subject matters detailed above, to arrive at the Applicant's current invention. By utilizing the extending format sectors as taught by Tuma and to including the backup-status-data field integral within each sector (instead of separately implemented on different memory), (a) it would allow for direct access of backup-status information from the sector level, therefore increasing the overall system throughput, and (b) preferable memory-area saving property can be greatly achieved by reducing unnecessary replication of access support circuits associated with each of the sector, thereby to improve the overall system performance, and broadening one's potential market and saving investment capital.

As per claim 7, Menon discloses the incremental backup indicator (bit map bit 118) indicates whether the user data in the user data sector field has been written to backup storage subsequent to a previous backup operation (e.g. see column 2, lines 4-7; and column 4, lines 49 et seq.);

As per claim 8, Menon discloses the incremental backup

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indicator bit of bit map 118 comprises a single bit (e.g. see column 4, lines 49 et seq.);

As per claim 9, Menon discloses the incremental backup indicator comprises an indicator of whether the user data in the user data sector field has been written to backup storage subsequent to a previous backup operation (e.g. see column 2, lines 4-7; and column 4, lines 49 et seq.); in addition, the data indicating the age of the user data sector field, for example, Menon discloses when the backup operation is completed, information about the backed up data (including identification of the source of the data, including an identification of the data storage device 108 and an identification of a sector's location on the data storage device 108, and the date and time that the backup operation was performed) is also recorded (e.g. see column 5, lines 32-39);

As per claim 10, the further limitation of the backup indicator indicates whether the user data sector field has been written to is equivalently taught as "at initial installation, before data is stored on the data storage device 108, the bit map 118 is created, the association between bits and sectors is established, and the bits are cleared. Thereafter, once a sector is changed on the data storage device 108, *but before completing a backup operation for the sector to the tape drive 110*, an indication of the modification is saved by setting the

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bit associated with the sector in the bit map 118 stored in the memory 114 of the storage controller 104" (e.g. see column 4, lines 61 et seq.);

As per 11, Menon discloses the invention as claimed including a data storage system comprising a host computer system 100, a first set of storage volumes is taught as data storage device 108, a second set of storage volumes for backing-up data from the data storage volume 108 is taught as tape drive 110 (e.g. see figure 1, column 2, lines 4 et seq.). Menon further discloses controller 104 for controlling transfer of data from the host computer 100 to the data storage device 108 and tape drive 110 (e.g. see column 2, lines 59 et seq.). Menon also discloses that the data storage device 108 comprises plurality of sectors wherein it's further known in the memory storage art that each memory sector of magnetic disk drive 108 **must** at least comprise multiple fields including data field for storing user data, and address field for storing address relating to the user data field (e.g. see column 4, lines 61-63). Noting that Menon clearly disclose the status bit map 118 stored in the memory 114 of storage controller 104 wherein each bit in the bit map 118 is assigned to each sector of the storage 108 for indicating the backup status for each sector (e.g. see column 4, lines 40-52).

Menon disclose the bit map 118 is stored separately in the memory 114 of the storage controller 104 and not being created as

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part of the sector format of data storage 108 in order to arrive at the extended format sector of the Applicant's current invention. Tuma, however, in his teaching of the disk-extended sector format, discloses a data recording media (hard disk 101, e.g. see figure 2) comprising a plurality of extended format sectors 10 (e.g. see column 3, lines 14 et seq.). Tuma discloses each of the extended format sector 10 comprising several fields, in addition to a user data sector field 17, for storing user data (e.g. see column 3, lines 16-17; figure 1a) and a status indicator field (flag-status-and-logical-unit field 13b) for indicating the status of the user address data field (e.g. see figure 1b, column 3, line 31). Accordingly, it would have been obvious to one having ordinary skill in the art at the time the current invention was made to combine the teaching of both inventions, for the subject matters detailed above, to arrive at the Applicant's current invention. By utilizing the extending format sectors as taught by Tuma and to including the backup-status-data field integral within each sector (instead of separately implemented on different memory), (a) it would allow for direct access of backup-status information from the sector level, therefore increasing the overall system throughput, and (b) preferable memory-area saving property can be greatly achieved by reducing unnecessary replication of access support circuits associated with each of the sector, thereby to improve

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the overall system performance, and broadening one's potential market and saving investment capital.

As per claim 12, Menon discloses the incremental backup indicator (bit map bit 118) indicates whether the user data in the user data sector field has been written to backup storage subsequent to a previous backup operation (e.g. see column 2, lines 4-7; and column 4, lines 49 et seq.);

As per claim 13, Menon discloses the incremental backup indicator bit of bit map 118 comprises a single bit (e.g. see column 4, lines 49 et seq.);

As per claim 14, Menon discloses the incremental backup indicator comprises an indicator of whether the user data in the user data sector field has been written to backup storage subsequent to a previous backup operation (e.g. see column 2, lines 4-7; and column 4, lines 49 et seq.); in addition, the data indicating the age of the user data sector field, for example, Menon discloses when the backup operation is completed, information about the backed up data (including identification of the source of the data, including an identification of the data storage device 108 and an identification of a sector's location on the data storage device 108, and the date and time that the backup operation was performed) is also recorded (e.g. see column 5, lines 32-39);

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As per claim 15, the further limitation of the backup indicator indicates whether the user data sector field has been written to is equivalently taught as "at initial installation, before data is stored on the data storage device 108, the bit map 118 is created, the association between bits and sectors is established, and the bits are cleared. Thereafter, once a sector is changed on the data storage device 108, *but before completing a backup operation for the sector to the tape drive 110*, an indication of the modification is saved by setting the bit associated with the sector in the bit map 118 stored in the memory 114 of the storage controller 104" (e.g. see column 4, lines 61 et seq.);

As per 20, Menon discloses the invention as claimed including a method for tracking the status of writes to areas of storage device 108 (e.g. see abstract, figure 1) comprises initializing a storage system and clearing a backup indicator field (bit map 118) in a sector used for indicating the status of a user data sector field of the sector in storage device 108 (e.g. see column 4, lines 61 et seq.), setting the backup indicator (status bit of bit map 118) when host 100 writes to a user data (e.g. see column 4, lines 64 et seq.), reading every sectors of storage device 108 and backing up only user data sectors having the backup indicator field set (e.g. see column 5, lines 7-23). Menon discloses data storage device 108 comprises a

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DASD such as a magnetic or optical disk drive (e.g. see figure 1, column 2, lines 51-53), Menon further discloses that the data storage device 108 comprises plurality of sectors wherein it's further known in the memory storage art that each memory sector of magnetic disk drive 108 **must** at least comprise multiple fields including data field for storing user data, and address field for storing address relating to the user data field (e.g. see column 4, lines 61-63). Noting that Menon clearly disclose the status bit map 118 stored in the memory 114 of storage controller 104 wherein each bit in the bit map 118 is assigned to each sector of the storage 108 for indicating the backup status for each sector (e.g. see column 4, lines 40-52). Menon disclose the bit map 118 is stored separately in the memory 114 of the storage controller 104 and not being created as part of the sector format of data storage 108 in order to arrive at the extended format sector of the Applicant's current invention. Tuma, however, in his teaching of the disk-extended sector format, discloses a data recording media (hard disk 101, e.g. see figure 2) comprising a plurality of extended format sectors 10 (e.g. see column 3, lines 14 et seq.). Tuma discloses each of the extended format sector 10 comprising several fields, in addition to a user data sector field 17, for storing user data (e.g. see column 3, lines 16-17; figure 1a) and a status indicator field (flag-status-and-logical-unit field 13b) for indicating the status of the user address

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data field (e.g. see figure 1b, column 3, line 31). Accordingly, it would have been obvious to one having ordinary skill in the art at the time the current invention was made to combine the teaching of both inventions, for the subject matters detailed above, to arrive at the Applicant's current invention. By utilizing the extending format sectors as taught by Tuma and to including the backup-status-data field integral within each sector (instead of separately implemented on different memory), (a) it would allow for direct access of backup-status information from the sector level, therefore increasing the overall system throughput, and (b) preferable memory-area saving property can be greatly achieved by reducing unnecessary replication of access support circuits associated with each of the sectors, thereby to improve the overall system performance, and broadening one's potential market and saving investment capital.

As per claim 21, Menon discloses clearing the backup indicator in bitmap 118 after the user data has been backed-up (e.g. see column 4, lines 49-55);

As per claim 22, see figure 2 for the repeating of the sequence steps in performing the backup operation.

Allowable subject matter

7. Claim 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and

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intervening claims. Claims 17-19 are also allowable since they are depended on the indicated allowable claim 16.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan V. Thai whose telephone number is (571)-272-4187. The examiner can normally be reached on from 6:30 A.M. to 4:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew M. Kim can be reached on (571)-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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TVT/November 04, 2004

Tuan V. Thai
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